

64,600-096; ERSO 900051  
Serial Number 10/154,068

### **REMARKS**

Favorable reconsideration of this application in light of the above amendments and the following remarks is respectfully requested.

Claims 1-18 are pending in this application. Claims 1 and 5 are amended herein. Claims 9-18 are withdrawn. No claims have been allowed.

Claim 1 is amended in part to correct a grammatical error.

### ***Restriction/Election***

Applicant affirms election of group I claims 1-8. Traverse is not taken.

### ***Claim Rejections - 35 U.S.C. § 103***

Claims 1-8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Burns et al. (Pub. No. US 2003/0145894; hereinafter “Burns”) in view of Desai et al. (U.S. Patent No. 5,921,678; hereinafter “Desai”).

Burns (abstract and cover figure) teaches a capillary reactor distribution device and method that provides a pair of entrance capillary pathways 2/3 through which flow a pair of immiscible fluids. Upon intersection at an exit capillary pathway 4 the pair of immiscible fluids provides alternating plugs of the immiscible fluids.

Desai (abstract and cover figure) teaches a microfluidic mixer with “T” shaped intersections.

At page 3, last paragraph of the office action mailed 7 October 2003, the Examiner reads Burns onto applicant's claim 1. In so doing, the Examiner at page 4, first full paragraph of the office action mailed 7 October 2003 asserts that Burns differs from applicant's claims in that Burns does not specifically teach Burns' apparatus as a "microfluidic" apparatus. Rather, the Examiner relies upon Desai at col. 3, line 53 to col. 4, line 26 as teaching a microfluidic mixing apparatus. The Examiner rationalizes suggestion or motivation for modification or combination of Burns with Desai "in order to increase manufacturing efficiency."

In response, applicant has amended claim 1 and amended claim 5 to effect "within the aperture [within applicant's microfluidic mixer apparatus] a swirling mixing of at least two reagents." Support for this limitation newly incorporated into claim 1 and claim 5 is found within Figs. 1-2 and paragraph 0035 which teach and illustrate a pair of reagents R1 and R2 being swirled and mixed within an aperture 11.

In comparison, the Examiner accurately cites Burns at page 5, paragraph 52 as teaching a vortex swirling. However, Burns at page 5, paragraph 52 in particular teaches such "vortex swirling inside the slugs." The slugs 16 and 17 are comprised of separate fluids, (i.e., fluid 1 and fluid 2) that are mixed employing Burns' apparatus (see Fig. 4 to Fig. 7). Since Burns teaches a "vortex swirling inside the slugs," Burns clearly does not teach "a swirling mixing within the aperture of at least two reagents introduced into the aperture through the at least two channels," as claimed in applicant's claim 1, clause 2 and claim 5, clause 2.

Burns at Fig. 15 and paragraph 0053 further "illustrates the flow dynamics of a pair of slugs 16, 17 which of necessity are separated within Burns exit capillary pathway 4.

64,600-096; ERSO 900051  
Serial Number 10/154,068

Since the flow dynamics of the pair of slugs 16, 17 is illustrated within Burns exit capillary pathway 4, the pair of slugs 16, 17 is clearly not subject to a swirling mixing within an aperture.

Thus, since each and every limitation within applicant's invention as disclosed and claimed within claim 1 and claim 5 is not disclosed within Burns and Desai combined in the fashion as suggested by the Examiner, in particular with respect to a swirling mixing within an aperture of at least two reagents introduced into the aperture, applicant asserts that claim 1 and claim 5 may not properly be rejected under 35 U.S.C. § 103(a) as being unpatentable over Burns in view of Desai. Since all remaining claims within the foregoing rejection are dependent upon claim 1 or claim 5 and carry all of the limitations thereof, applicant additionally asserts that those remaining claims may also not properly be rejected under 35 U.S.C. § 103(a) as being unpatentable over Burns in view of Desai.

In light of the foregoing response, applicant respectfully requests that the Examiner's rejections of claims 1-8 under 35 U.S.C. § 103(a) as being unpatentable over Burns in view of Desai be withdrawn.

#### ***Other Considerations***

Applicant acknowledges the additional prior art of record cited by the Examiner but not employed in rejecting applicant's claims to applicant's invention, in particular, Bennett et al. (U.S. Patent No. 6,494,614), Lee et al. (U.S. Patent No. 6,146,103) and Chung (U.S. Patent No. 6,331,073), as generally pertinent to applicant's invention.

64,600-096; ERSO 900051  
Serial Number 10/154,068

### **SUMMARY**


Applicant's invention as disclosed and claimed within amended claim 1 and amended claim 5 is directed towards a microfluidic mixer apparatus and method for operation of the same. Within the microfluidic mixer apparatus and method, at least two channels terminate with respect to an aperture such as to effect within the aperture a swirling mixing of at least two reagents introduced into the aperture through the at least two channels. The prior art fails to teach each and every limitation within applicant's claim 1 and claim 5.

### **CONCLUSION**

On the basis of the above amendments and remarks, reconsideration of this application, and its early allowance, are respectfully requested.

Any inquiries relating to this or earlier communications pertaining to this application may be directed to the undersigned attorney at 248-540-4040.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Randy W. Tung', is written over the typed name below.

Randy W. Tung (Reg. No. 31,311)

838 West Long Lake Road - Suite 120  
Bloomfield Hills, MI 48302  
248-540-4040 (voice)  
248-540-4035 (facsimile)